

the reACTant

Volume 10 Number 1 Fall 2002

On the web at <http://www.statweb.org/ACT2>

The Newsletter of the Associated Chemistry Teachers of Texas

Ole! CAST El Paso

by Rosendo
García

Have you registered for CAST yet? Well, what are you waiting for? CAST is November 7-9 in El Paso. It'll be fun to have that extra hour of sleep (for most of us) as we join the Mountain Time Zone for a few days. Go to the CAST web site <CAST2002.org> and click the online registration link Right Now and register!

The site allows you to pay by credit card for immediate confirmation. Or you can register and send a check with confirmation after your check arrives at STAT. Either way it's the best way to register for the best event of the fall (next to Mole Day that is).

We are sponsoring a full day of workshops on Friday, November 8 ranging from middle school Chemistry to AP Chemistry. This way we knew there would be a few sessions most of us would be interested in. All our sessions will be at the convention

center (close to the exhibits and the hotels). We will start with an hour long session by Rene McCormick at 9:45am. Rene will have info on teaching chemistry to middle school IPC students. Next we will offer a session on Lab Safety at 11:15am. This session will highlight safety equipment and storage. We also plan to have the newest TEA Lab Safety guidelines. After lunch at 1:30pm we will have Roxy Allen and Penny Sconzo present a session with some of the best

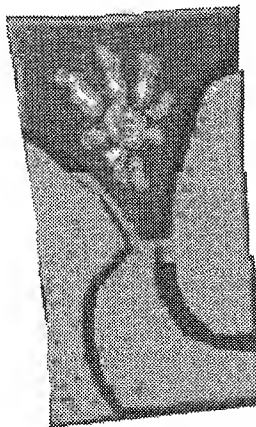
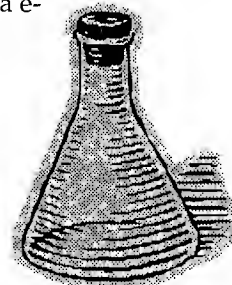
activities and info from the Journal of Chemistry Education. We have Lisa McGaw scheduled for 3:00pm with strategies for teaching AP Chem. Lisa is one of the best AP teachers and she has helped score the AP test and has tips to help improve students' scores.

We finish off our "Day of Chemistry" with our Share-a-thon. Bring something to share (about 50 copies) and become famous! Everybody will be using your handout to help teach their students. Make plans to be at the Share-a-thon even if you don't have something to share. Come and get ideas from some of the best Chemistry teachers around - ACT₂ members! We also plan to remember George Hague at the session by presenting stuff that he first inspired. Bring your memories of George, handouts you got from George, demos you got from George, songs you got from George, and ideas motivated by George and share them with the rest of us. The Share-a-thon promises to be the best one ever. Don't miss it!

Between all the field trips, workshops, and lectures, don't forget the exhibits. The ACT₂ table is always a must. Stop by and get some of the FREE stuff we'll have. We will also have a few items for sale, so bring a few bucks too. President-elect Roxie Allen is looking for your help at the ACT₂ booth. If you can help at the booth, contact Roxie via e-mail at rallen@sjs.org. Become an active part of ACT₂ and donate an hour or so at the exhibit table.

CAST would not be CAST without the Luncheon! ACT₂ will once again have the biggest and best lunch. Penny Sconzo will be our guest speaker and she is great! For only \$16 bucks you get lunch, Penny, camaraderie, and Door Prizes. Plus we *guarantee* to send everybody home with classroom goodies. Get your ticket for the ACT₂ Luncheon! If you need a ticket, come by the booth and purchase one. You don't want to miss out.

So, go online and register! We'll be waiting for you at the booth. Check at the ACT₂ booth for the latest information. We have been known to have a special workshop on glassware. See all y'all there!!



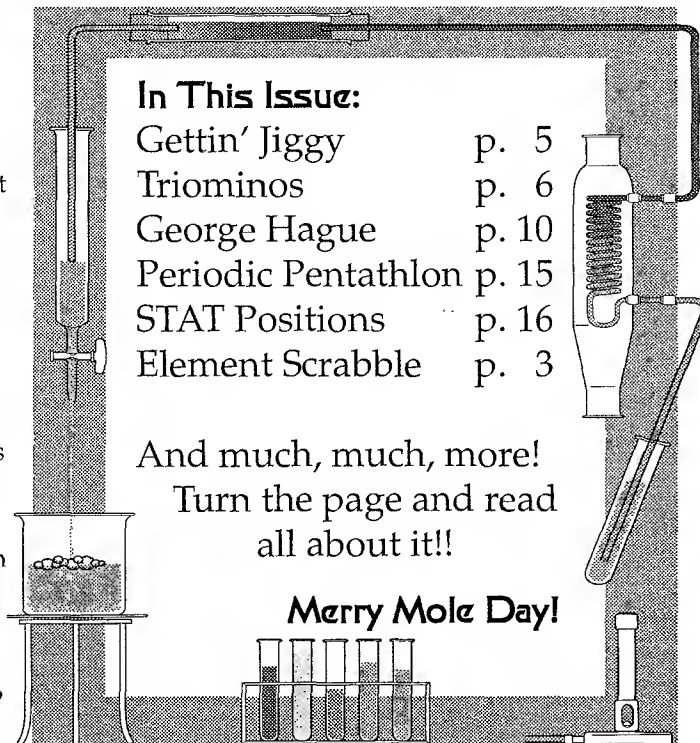
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And much, much, more!

Turn the page and read
all about it!!

Merry Mole Day!



President's Corner

School days! School days! Dear old golden school days! Hope everyone's start of school went smoothly. We all have new books, which is both a blessing and a curse. It is nice to have those new books with new ancillaries; however, with those new books come new notes, new handouts, new labs and so MANY ancillaries to look at and choose from. Sometimes a good thing can be too much.

This is the year of the TAKS. Remember (she says with tongue in cheek), the **ONLY TEKS WE REALLY HAVE TO TEACH ARE THE ONES THAT ARE TESTED ON THE TAKS**. Or so I've been told. "Tell the chemistry teachers to relax! Just worry about the IPC TEKS that are on the TAKS and if you get more in—fine, but don't sweat the 'small' stuff." Of course, my own personal view is if we are testing the IPC TEKS then why isn't IPC a required course? And then let Chemistry BE chemistry, but enough of my soapbox. Good luck to all as we prepare our students for this challenge!

We did lose a very special member this summer – George Hague lost his battle with cancer. We are all saddened by this loss. There is a gaping hole in chem. ed. that will be difficult to fill. I remember the first time I saw George. It was in the early 80's and NSTA was in Ft. Worth (or was it Dallas?). I wandered in to George's session and my perception of what I do in the classroom was changed forever. At the time he was still teaching in New Jersey. Soon after that St. Mark's made him "an offer he could not refuse." New Jersey's loss was Texas' gain. George left his mark is on this organization and I hope we will continue to honor his memory.

We are planning a grand time in El Paso and hope you are planning on joining us.

I guess that about sums up the happenings – See you in El Paso!!



Melissa Jones



Melissa Jones

Treasurer's Report

6/24/02 - 8/30/02	
By Dale Moore	
Opening Balance	\$15464.03
Income	
Interest	\$9.86
Member dues	\$447.00
Total Income	\$456.86
Expenses	
Supplies	\$48.89
Printing	\$60.00
Postage	\$256.87
Promotions	\$294.11
Biennial 2003 (seed \$)	\$2000.00
Reserve Fund	\$6000.00
Total Expenses	\$8659.87
Total Income - Expenses	\$7261.02

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Schulz Award

The Dallas-Fort Worth Section of the American Chemical Society asks for nominations for the 2003 Werner Schulz Award for Outstanding High School Chemistry Teaching. The award was established in 1990 to honor the memory of Dr. Werner Schulz, an outstanding high school chemistry teacher. This year's winner was Karl Jones of Newman Smith High School in Carrollton, TX.



The award is intended for high school teachers who reside in the area served by the D-FW Section of the ACS and who, like Werner, bring something extra to the teaching of chemistry. Nominees need not be members of the ACS. The award consists of a \$1000

honorarium, an engraved plaque, and a traveling plaque which stays at the winner's high school for the year of the award. A photo of the winner will permanently reside in the Gallery of Schulz Award Winners at the Science Place I in Dallas.

The D-FW section stretches from Abilene to Sherman to Commerce to Stephenville. Nomination forms may be obtained from and should be submitted to:

Dr. Michael Biewer
Department of Chemistry
University of Texas at Dallas
P. O. Box 830688
Richardson, TX 75083.

Nominations should reach Dr. Biewer by Jan. 31, 2003.
phone: 972-883-2811
e-mail: biewerm@utdallas.edu



by Rosendo Garcia

Element Scrabble

Many people like to play Scrabble to demonstrate their vast vocabulary. I had my students play Scrabble with the symbols on the periodic table. The only rule was not to use the same symbol more than once in a word. One student came up with over 400 words over a weekend. Here are some of the words they came up with.

FrAtErNiTiEs	NoBiLiTiEs
INVerSe	ArTiCuLaTe
AlTeRnAtION	SCrIBe
CoNFUSION	LiBeRaTiON
ThINK	LiMoUSiNe
ScOLiOsIS	OsMoSiS
AmErICa	FeSTiVAL
FRaPPaCHINO	AuSTiN
AmBiTiOUS	PoTeNTiAl
MoThEr	AtTeNTiON
AcTiON	CaUTiON
CaUSTiC	PuNiSH
FRoLiC	WATer
CiNNaMoN	BaNaNAs



Phosphorus

by Dr. Jim Marshall
University of
North Texas

Hennig Brand, a seventeenth century alchemist and physician of Hamburg, learned how to extract from urine a waxy, white substance that glowed in the dark. Soon the secret recipe was out, and many chemists were preparing the mysterious substance, studying it, and displaying it in public and in regal court. Soon phosphorus was found not only in urine, but in other animal and vegetable matter; in the 1700s bones were discovered to consist of "lime saturated with phosphoric acid." Before the true nature of combustion was understood, phosphorus was considered an "escape of phlogiston." It was observed that white phosphorus, when exposed to light, is transformed into red phosphorus. Berzelius showed the two forms were modifications of the same element. In the 1800s phosphorus was used in matches.



Phosphorus is found in minerals in the form of phosphates, and in living systems in protoplasm (in nucleic acids) and bones (as hydroxyapatite). White phosphorus ignites spontaneously in the air and is stored under water, but red phosphorus is safer. Phosphates are extensively used as fertilizers in agriculture and horticulture. Monosodium phosphate is used in baking powder. Phosphorus is used in the production of bronze and other metals. Trisodium phosphate is used as a cleaning agent, water softener, and corrosion inhibitor.

Phosphorus

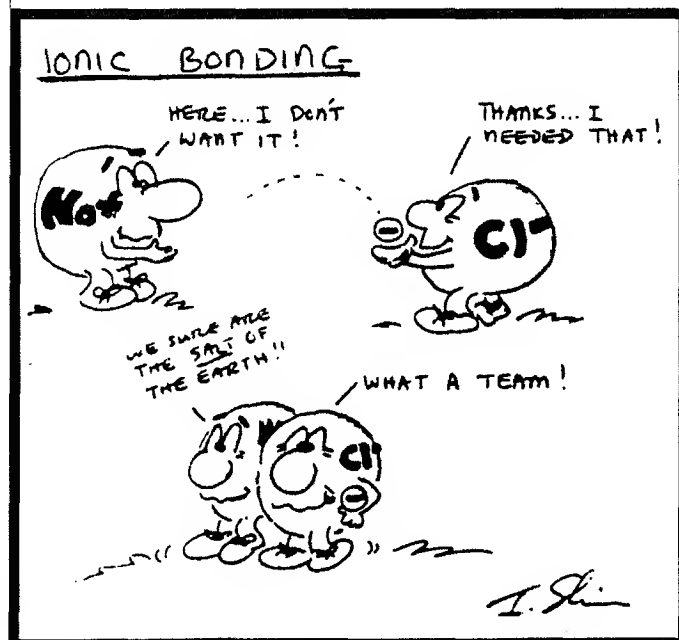
P 15

[Gr. *phosphorus*, light bearing]

Discovered 1669

mp 553 K; sp gr (white) 1.82, (red) 2.20

Discovery of the Elements, by Dr. Jim Marshall of UNT



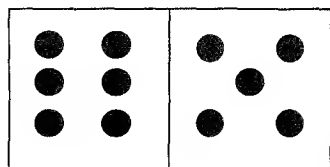
Significant Dominoes

Purpose: To practice determining whether digits are significant or not.

Materials: dominoes (real or paper copies)

Procedure:

- In groups of 4 - 6, put all dominoes face down.
- Player One draws 3 dominoes and turns them over.
- Write down the value displayed, according to these rules:
 - ALL EVEN NUMBERS (AND BLANKS) = ZERO.
 - THE FIRST 3 OR 5 COUNTS AS A DECIMAL POINT.
 - ALL OTHER NUMBERS ARE WHAT THEY SHOW.
- Player One decides how many significant digits are in the number he or she has written down.
- The other players decide if the answer is correct.
- Score one point for each correct answer. Have one person keep score.
- Any player who falls three points behind the others gets four turns in a row.
- The winning team will be the one(s) that ace the quiz.



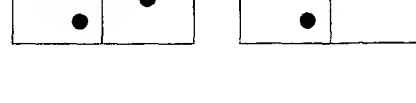
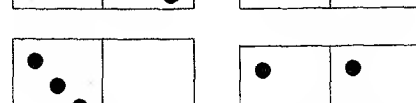
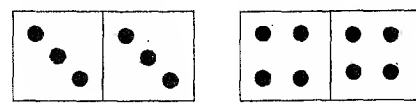
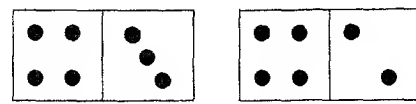
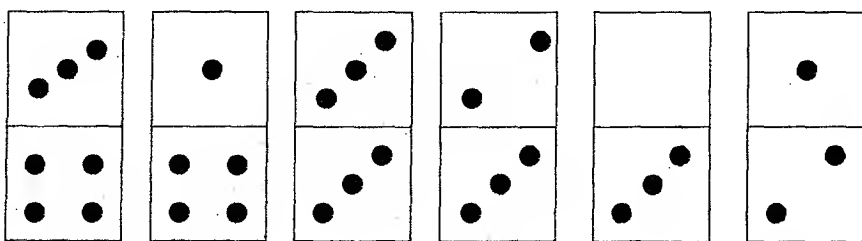
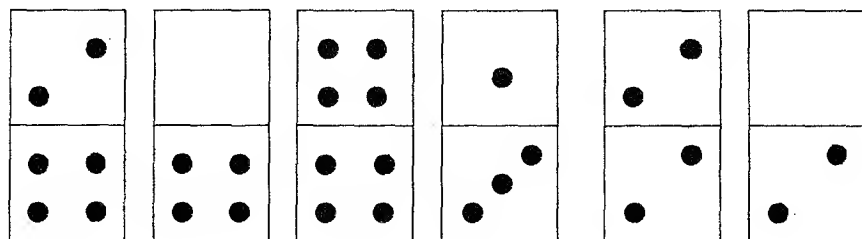
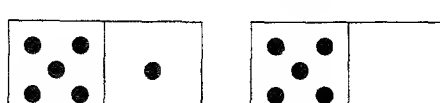
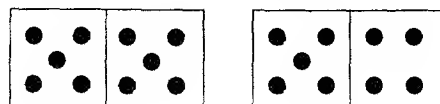
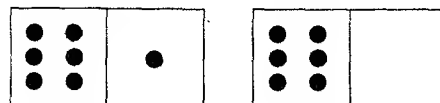
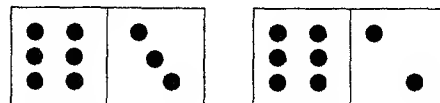
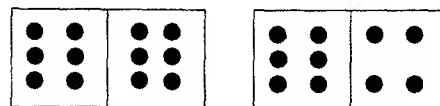
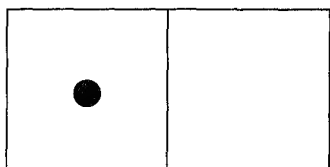
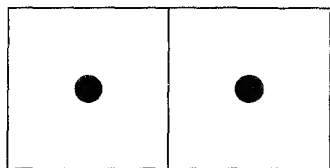
Example:

If the dominoes to the right were drawn, the value would be

0.1110

because 6, being an even number, counts as a zero, and the first five counts as a decimal point. The remaining numbers count as what they show: 1, 1, 1, and blank = 0.

This number has four significant digits.



by George Hague
St. Mark's School

Liquid N₂ Ice Cream

from *Southwest Retort*, April 2000

Safety: anyone stirring must wear goggles and safety gloves are a good idea. Keep all others a safe distance away.



Materials:

half-and-half (1 qt), whipping cream (1 qt), eggs (3-4) (or egg beaters), sugar (1 cup), vanilla (4-5 tsps), Liquid Nitrogen (5L), ice cream scoop, small paper or polystyrene cups, plastic spoons, napkins, large bowl

Precedure:

Into a large bowl (a clear plastic bowl will enable your audience to see what is going on inside — I use a Tupperware bowl about 18 inches wide and 8 inches deep)

- (1) Add equal parts of half-and-half (1 qt) and heavy whipping cream (1 qt).
- (2) Mix the following together with milk/cream mixture until all the sugar is well dissolved—use whisk or wooden spoon:
One cup granulated sugar
Equivalent of 3-4 artificial eggs (I use one 8 oz carton of Egg Beaters)
Add 4-5 teaspoons of vanilla extract

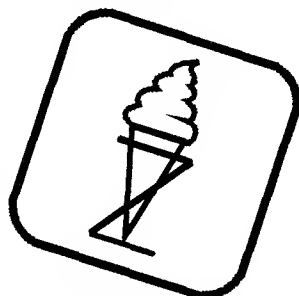


If desired: add 16 ounces of preserves (not jelly!) I have found that the strawberry and peach work well.

- (3) Slowly add 5 L of liquid nitrogen to the mix and stir continually with a wooden spoon—or you will get frozen clumps!
- (4) When you cannot stir any more, the ice cream is ready. Allow the excess nitrogen to boil off and wait for the cloud of water vapor to disappear.

Makes 1 gallon — 30+ small servings

Caution: Handle liquid nitrogen with great care as it is very cold. It boils at -196°C and readily causes frostbite to exposed skin. Keep students a safe distance away. Only transport liquid N₂ in an approved container like a Dewar flask. Lactose-intolerant members of the audience should not sample the ice cream.



Gettin' Jiggy

by Shelley Abernathy
Baird High

Gettin' Jiggy Wid da Siggy Diggy

Uh, uh, uh, yea.
Uh, uh, uh, yea.

You know your calculator,
You think it is your friend.
You love all of its numbers,
All thirteen at the end.



Chorus

Gettin' jiggy wid da siggy diggy
Yea, yea, uh, uh.
Gettin' jiggy wid da siggy diggy
Yea, yea, uh, uh.

Now when it comes to zeros,
Sometimes they just hold place.
You must know their significance,
So you can save your face.



Chorus

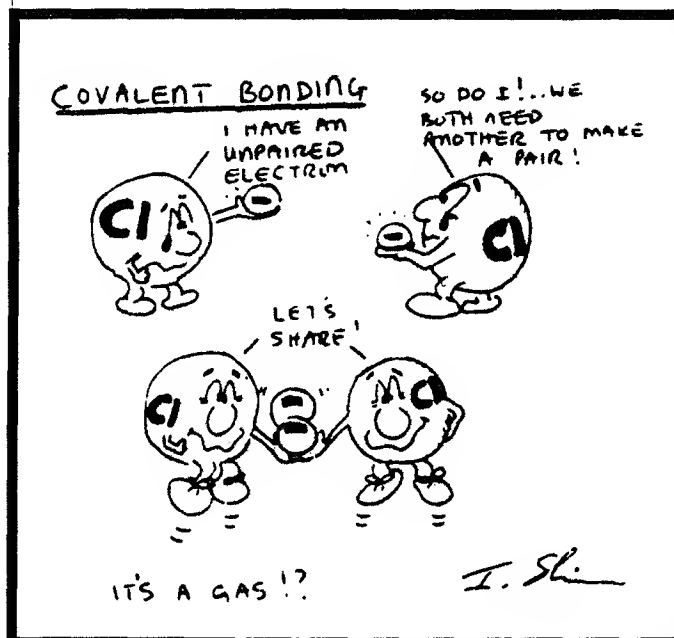
For sig dig in your answer,
You must look at the given.
Just match up with the smallest one,
And you will be in heaven.

Chorus

If within your answer,
You find that you must round,
You can only do it one time
For your numbers to be sound.



Chorus



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St. Mark's School

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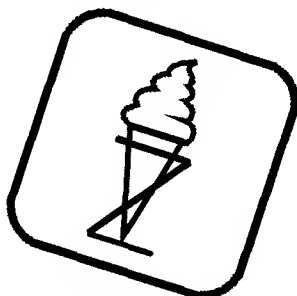


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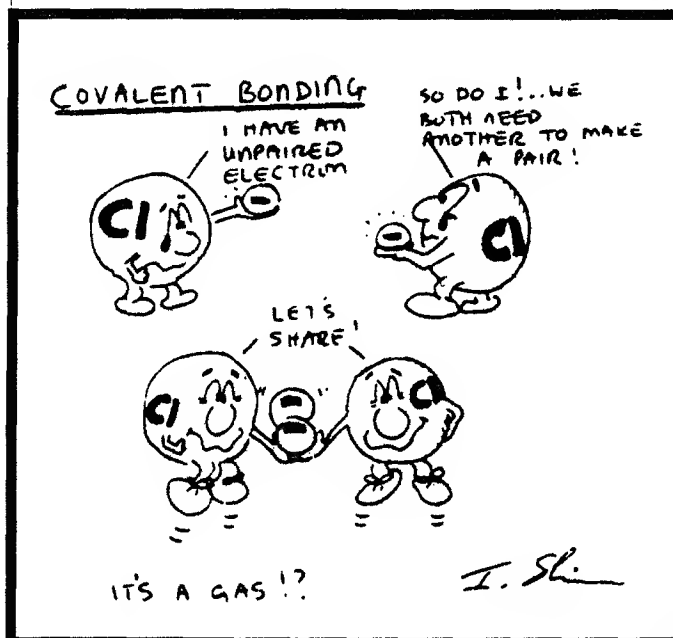
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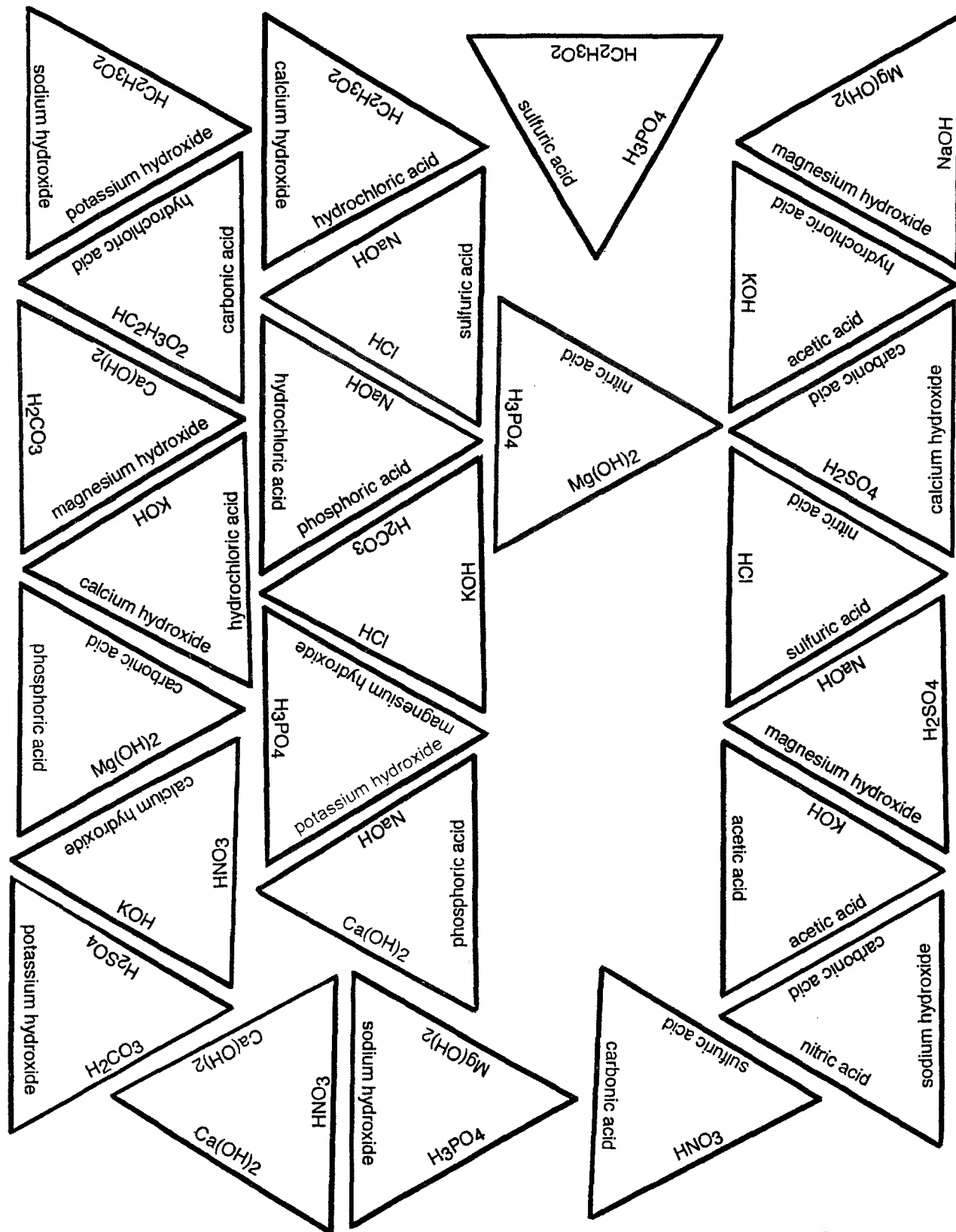


Chorus

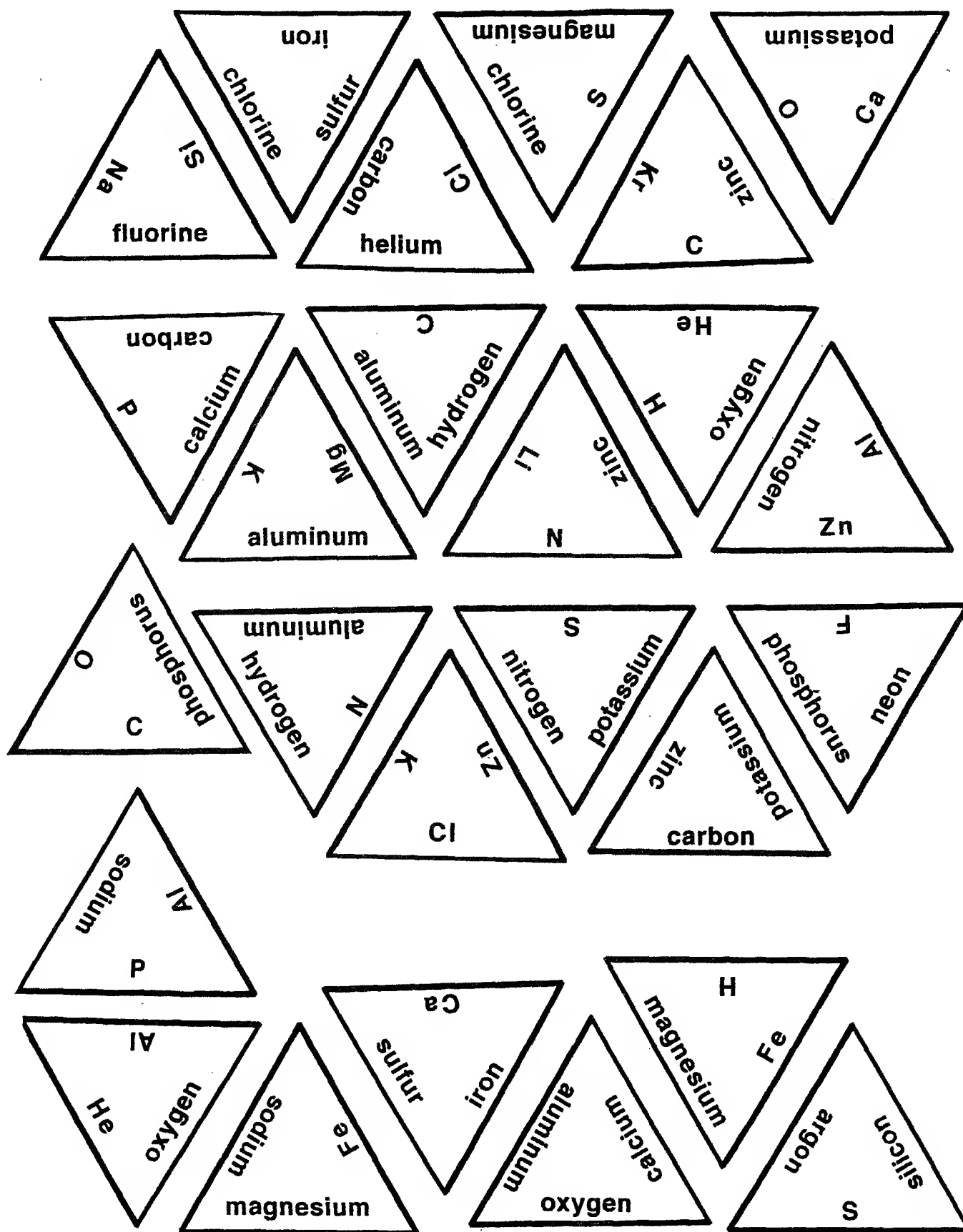


Triominos

Almost all of us have played dominos where you match up the numbers on the dominos. A few years ago a game came out that was called "Triominos." The pieces in this game were triangular and you had to match up numbers on three sides. Here and on the next few pages are some "triominos" for learning acid/base formulas and one for learning element symbols and names. There are also some square dominos for learning polyatomic ions. Enlarge them on a copy machine or make your own. Have fun!



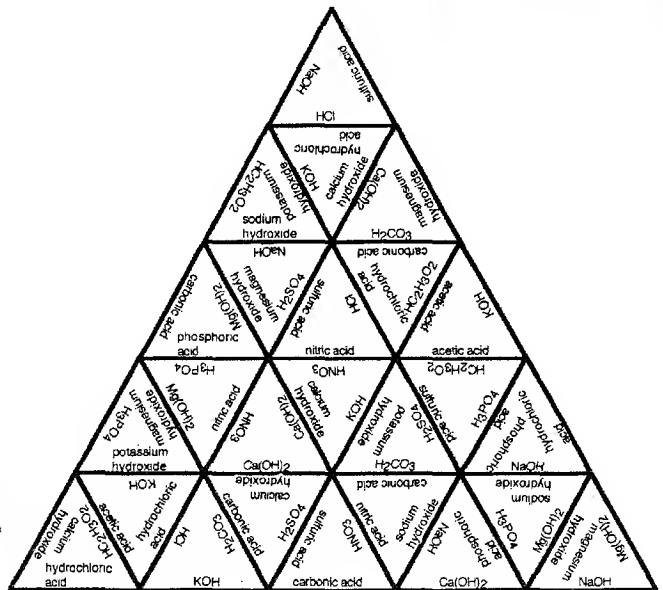
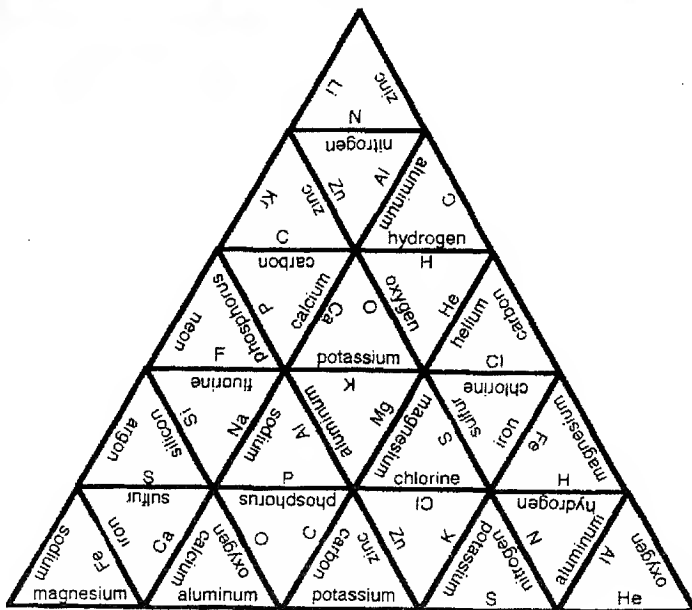
Element Triominos



Polyatomic Dominos

<p>sulfate</p> <p>ammonium</p> <p>SO_4^{2-}</p> <p>hydroxide</p>	<p>NO_3^-</p> <p>chlorate</p> <p>SO_4^{2-}</p> <p>sulfate</p>	<p>nitrate</p> <p>OH^-</p> <p>phosphate</p> <p>ClO_3^-</p>	
<p>ammonium</p> <p>phosphate</p> <p>NO_3^-</p> <p>SO_4^{2-}</p>	<p>ammonium</p> <p>PO_4^{3-}</p> <p>acetate</p> <p>SO_4^{2-}</p>	<p>CO_3^{2-}</p> <p>hydroxide</p> <p>nitrate</p> <p>ClO_3^-</p>	
<p>OH^-</p> <p>ammonium</p> <p>ClO_3^-</p> <p>OH^-</p>	<p>carbonate</p> <p>sulfate</p> <p>chlorate</p> <p>nitrate</p>	<p>PO_4^{3-}</p> <p>acetate</p> <p>NH_4^+</p> <p>hydroxide</p>	<p>carbonate</p> <p>sulfate</p> <p>NO_3^-</p> <p>$C_2H_3O_2^-$</p>
<p>sulfate</p> <p>carbonate</p> <p>$C_2H_3O_2^-$</p> <p>NH_4^+</p>	<p>NH_4^+</p> <p>phosphate</p> <p>CO_3^{2-}</p> <p>PO_4^{3-}</p>	<p>carbonate</p> <p>acetate</p> <p>nitrate</p> <p>$C_2H_3O_2^-$</p>	
<p>PO_4^{3-}</p> <p>nitrate</p> <p>CO_3^{2-}</p> <p>NH_4^+</p>	<p>OH^-</p> <p>sulfate</p> <p>acetate</p> <p>NO_3^-</p>	<p>sulfate</p> <p>hydroxide</p> <p>PO_4^{3-}</p> <p>$C_2H_3O_2^-$</p>	

Triominos Keys

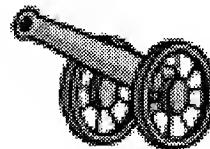


ammonium	hydroxide	sulfate	ammonium	hydroxide	sulfate
OH ¹⁻	OH ¹⁻	CO ₃ ²⁻	OH ¹⁻	OH ¹⁻	CO ₃ ²⁻
ammonium	ammonium	nitrate	ammonium	nitrate	nitrate
NH ₄ ¹⁺	NH ₄ ¹⁺	NO ₃ ¹⁻	NH ₄ ¹⁺	NO ₃ ¹⁻	NO ₃ ¹⁻
acetate	acetate	hydroxide	acetate	hydroxide	hydroxide
C ₂ H ₃ O ₂ ¹⁻	C ₂ H ₃ O ₂ ¹⁻	CO ₃ ²⁻	C ₂ H ₃ O ₂ ¹⁻	CO ₃ ²⁻	CO ₃ ²⁻
carbonate	carbonate	sulfate	carbonate	sulfate	sulfate
ammonium	ammonium	nitrate	ammonium	nitrate	nitrate
NH ₄ ¹⁺	NH ₄ ¹⁺	NO ₃ ¹⁻	NH ₄ ¹⁺	NO ₃ ¹⁻	NO ₃ ¹⁻
acetate	acetate	nitrate	acetate	nitrate	nitrate
C ₂ H ₃ O ₂ ¹⁻	C ₂ H ₃ O ₂ ¹⁻	PO ₄ ³⁻	C ₂ H ₃ O ₂ ¹⁻	PO ₄ ³⁻	PO ₄ ³⁻
hydroxide	hydroxide	carbonate	hydroxide	carbonate	carbonate
PO ₄ ³⁻	PO ₄ ³⁻	CO ₃ ²⁻	PO ₄ ³⁻	CO ₃ ²⁻	CO ₃ ²⁻
ammonium	ammonium	nitrate	ammonium	nitrate	nitrate
NH ₄ ¹⁺	NH ₄ ¹⁺	NO ₃ ¹⁻	NH ₄ ¹⁺	NO ₃ ¹⁻	NO ₃ ¹⁻
hydroxide	hydroxide	acetate	hydroxide	acetate	acetate
PO ₄ ³⁻	PO ₄ ³⁻	CO ₃ ²⁻	PO ₄ ³⁻	CO ₃ ²⁻	CO ₃ ²⁻
ammonium	ammonium	nitrate	ammonium	nitrate	nitrate
NH ₄ ¹⁺	NH ₄ ¹⁺	NO ₃ ¹⁻	NH ₄ ¹⁺	NO ₃ ¹⁻	NO ₃ ¹⁻
acetate	acetate	hydroxide	acetate	hydroxide	hydroxide
C ₂ H ₃ O ₂ ¹⁻	C ₂ H ₃ O ₂ ¹⁻	ClO ₃ ¹⁻	C ₂ H ₃ O ₂ ¹⁻	ClO ₃ ¹⁻	ClO ₃ ¹⁻
hydroxide	hydroxide	nitrate	hydroxide	nitrate	nitrate
PO ₄ ³⁻	PO ₄ ³⁻	SO ₄ ²⁻	PO ₄ ³⁻	SO ₄ ²⁻	SO ₄ ²⁻

Good Bye, Capt. Chem

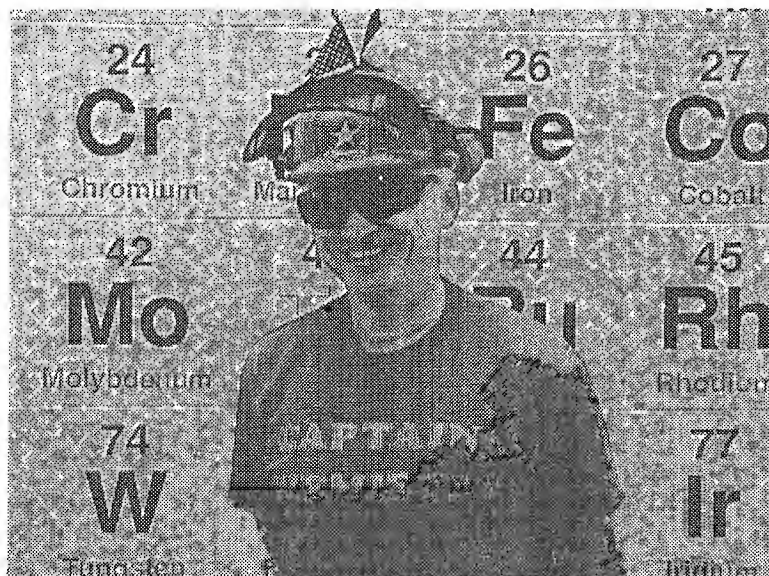
How do you say goodbye to a friend you love and admire? Perhaps you shouldn't try. I'm sure that my first memory of George Hague isn't so different than that of so many others – "is he really wearing that scary spandex outfit with a hard hat?" As a young and impressionable teacher, by the end of that CAST session I was so fired up to preach Chemistry to the masses that I believe I could have shot off a calcium carbide cannon loaded with sheer enthusiasm. I still wasn't sure what ChemEd was, but I knew if I didn't go some day, I would have missed the opportunity of a lifetime.

Well, quite a few years have passed since that day and yet George's ability to inspire never ebbed. Whether it was CAST or NSTA or ChemEd or the ACS or the Mole Day Foundation, George was always there and he always had something to share. No one could match his exuberant spirit that pervaded a room from the moment he entered. For all of his bravado, the qualities I admired most in George were the quieter, more behind-the-scenes ones. He wore so many hats - planning workshops and demonstration shows, writing comments at the end of marking periods, playing with kids and grandkids, serving on committees and organizing boards, writing articles, even some coaching - yet he met every deadline and fulfilled every obligation. We'd like to think we are always good at keeping our word: well, George was. If he said he was going to do it, he did. Most of all, he was a truly kind man.



Texas gained a giant when George came down from New Jersey and he had a big impact on science teachers in Texas. On the STAT Board he fought tirelessly for affiliate representation in board decisions. As ACT₂ President, he rejuvenated our organization by focusing on better communication with the membership. He also encouraged a greater presence at CAST through our booth, the luncheon and Share-a-Thon. I think it was George's efforts that have made the ACT₂ luncheon one of the most sought-after tickets at CAST. He was a wonderful model for leadership and I have him to thank for the many lessons he taught me.

So, let's imagine George as a neutron hurtling through space towards an audience of unstable teachers. As fission occurs, each teacher releases enough neutrons to collide with each of his students, and so on and so on. Now that's one heck of a chain reaction! So on October 23rd when you're celebrating Mole Day sing a little louder for George! Next time you do that favorite demonstration, make it just a little bolder (but do it safely!) for George! Help that struggling student by reminding him of George's motto "Chem Is Try" and don't let him give up! Nurture and encourage that new teacher down the hall by sharing generously and getting him involved – that's what George did! How do we say goodbye to Captain Chemistry – well, isn't he still here in all of us?



Chem Gem and Joule: "Captain Chemistry" (1940-2002)

To George: You and your songs will be missed. Happy molar trails. I salute you! Diana Mason

The chemistry world has lost one of its extraordinarily mentors affectionately known as "Captain Chemistry". George Hague passed away on July 15 following a long battle with leukemia. I know that many of you knew George and of his contributions. Many of us were fortunate to be able to consider him a friend and a mentor. George was without a doubt one of my mentors. I met George soon after I began teaching at Jesuit College Prep. He taught at St. Mark's School of Texas in Dallas, a major rival of Jesuit. The two all-male schools were located within a mile of each other. Not only were George and I likeminded chemistry teachers, but we also coached our schools' volleyball teams. (Without fail my teams always lost to George's, except for one time in my two-year coaching career when my J.V. beat George's—by far the highlight of my brief coaching career!) His approach to coaching, teaching, and mentoring were joyous to watch and experience. As first impressions are lasting—this long, tall, adopted Texan's (thank you, New Jersey) enthusiastic presentations in the classroom and on stage were memorable and will be missed. I'll never forget how excited (and engaged) I was when I first saw George present at a conference. I had seen demonstrations performed before, but never with such flair. He knew the benefit of a demo, the value of a song, and the merit of giving to others. He knew his chemistry and how to make it come alive for others. He had the voice, the talent, and the gift of teaching in such a manner that his audiences (big or small) always felt that they were part of the experience. The most important lesson that I take from him is to volunteer my time. George gave of himself and his time. He presented over 300 presentations at numerous conferences, professional workshops, and science conventions (way too many to list) all around the world. He led by example and was always willing to share and give credit to those who had helped him. He was there to serve and people noticed.



Salutes to "Captain Chemistry"

Lee Marek, fellow demonstrator and friend: "When I went to ChemEd or NSTA, I expected to see George, and the same with Cliff Schrader. These were people I looked forward to talking to - giants of High School Science teaching. These were people who tried to share with others and work with others to make chemistry teaching better and more interesting to teachers and students alike. All in the teaching community will miss him."

Larry Flinn, Flinn Scientific, Inc: "He was an absolutely fantastic person! He will be missed."

Roger Stryker, Past President of the Science Teachers' Association of Texas, remembers serving with George on the Beaumont CAST and remembers George for his, "... infectious humor, friendly personality and enthusiasm for science."

Lew Brubacher, Editor of *Chem13 News*: "George Hague was a good friend of chemistry teachers everywhere. Of course, we appreciate the work he did for teachers through CHEM 13 NEWS, but also in many other venues. Who hasn't had liquid nitrogen ice cream, inspired by George? We'll miss him, but we'll remember him fondly".

Mike Offutt, chemistry songwriter: "His bright spirit, enthusiasm, and creativity in education will be missed. I will always remember singing silly chemistry songs with him and participating in workshops with him."

Jerry Mullins, a friend from Plano Senior High School: "...what a loss to chemical education and to students ... he contributed so much to the improvement of high school chemistry."

Selected Honors for George Hague (B.A., M.A., Montclair State University)

St. Mark's School of Texas: Leonard N. "Doc" Nelson Alumni Master Teacher; Chemistry; AP Chemistry; JETS Sponsor; Science Bowl Coach; Chemistry Olympiad Coach.

- 1940: October 9, birth of a legend in East Orange, NJ
- 1962: Montclair St. College graduation
- 1967: Shell Merit Teacher, Cornell University
- 1982: Regional Catalyst Award - Outstanding Teacher of High School Chemistry, Chemical Manufacturer's Association
- 1983: Presidential Award for Excellence in Science and Mathematics Teaching
- 1984: American Chemical Society Middle Atlantic Regional Award for Excellence in High School Chemistry Teaching
Joined faculty at St. Mark's School of Texas
- 1985: Dreyfus Master Teacher of Chemistry
- 1991: American Chemical Society Southwest Regional Award for Excellence in Teaching High School Chemistry
- 1991: Dallas-Ft. Worth Local ACS Section Schulz Award
- 1993-95: President, Associated Chemistry Teachers of Texas
- 1995: National Tandy Technology Scholar Outstanding Teacher Award Advanced Placement Special Recognition Award, The College Board
- 1998: Responsible Care National Catalyst Award for High School Chemistry Teaching, Chemical Manufacturer's Assn.
- 1998: Associated Chemistry Teacher Outstanding Teacher of the Year
- 2001: "The Ultimate Chemical Equations Handbook" by Hague and Smith published
- 2001: Irwin Telesnik International Chemistry Teacher of the Year Award



Effective Science Teaching and George Hague

As many of you know, I have taken a break from teaching to work towards a doctorate degree in Chemical Education at Purdue University. I thought those of you considering to do the same might be interested in some of my experiences and that many of you would be interested in some of the aspects of chemistry education that are being explored. I invite your comments, suggestions, interests, and questions so please feel free to contact me at <lylek@purdue.edu>.

Recently the ACT family lost a dear, dear friend, George Hague. As many of you well know, George has served as an ideal model for each of us to strive for as educators, as professionals, and as human beings. At the last biennial conference I was asked to fill in for him and though I willingly agreed I knew that there was no way that I could fill his shoes. It was an honor and a very humbling experience.

In fulfilling requirements for a course in science education, I conducted a meta-analysis of the literature dealing with the characteristics of an effective science teacher. As I look back at that paper and look at all that George has done in his life, I can see that George not only possessed all of the characteristics identified but excelled in each aspect. I thought I would share the findings of the analysis because George truly exemplified each of these characteristics throughout his professional career as a chemistry teacher.

Of the numerous qualities of effective science teachers I found ten aspects that consistently appeared in the literature. Effective science teachers — (1) are knowledgeable of and confident in subject content area; (2) are life-long learners; (3) care for students as learners and as individuals; (4) create a positive, safe classroom atmosphere that challenges the students; (5) use a variety of pupil-centered activities that are well planned, highly organized, and designed to effectively enable the students to understand the complexities of science; (6) are aware of the varied interests and learning styles of the students; (7) effectively use models, analogies, materials, demonstrations, lab experiments, and other instructional strategies; (8) are constantly assessing behaviors and learning; (9) serve as a positive role model for students, and (10) are enthusiastic about science and the teaching of it.

As part of the research for this paper I asked George for his views on what made him an effective and successful chemistry teacher. Below is his response.

“What makes me an effective and successful chemistry teacher? This is not something I have ever really given serious thought to! I have three tips I pass on to teachers:

- 1) Keep your standards high.
- 2) Be fair.
- 3) Love your students as if they are your own children.



I have been told I have a passion and enthusiasm for teaching chemistry. A sense of humor is also important. I work long hours (average of 80 hours a week); stress “hands-on” chemistry; I am always looking for new ideas to use in the classroom; fight for the students and programs I teach. Being actively involved in local/state/national science/chemistry organizations and conferences have helped to make me a better teacher.

Teachers should not be afraid to make fools out of themselves in front of their students. Students believe teachers are making fools out of themselves everyday! I have my students sing science songs. I have all kinds of scientific T-shirts I wear and costumes to change into (e.g., Captain Chemistry). I hold out carrots for my students in order to help them better perform. High standards are a MUST!

Being an effective science teacher is both time consuming and energy draining. It is as close to a 24-hour job as one can get.

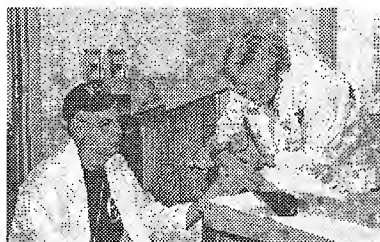
Another key: I know my subject matter very well and I enjoy “turning on” my students to science.” There is nothing as rewarding as seeing the “little light” go on when a student understands a particular topic or concept!

I have often said there is a little boy who lives inside of me and as long as I live, so will that little boy!”

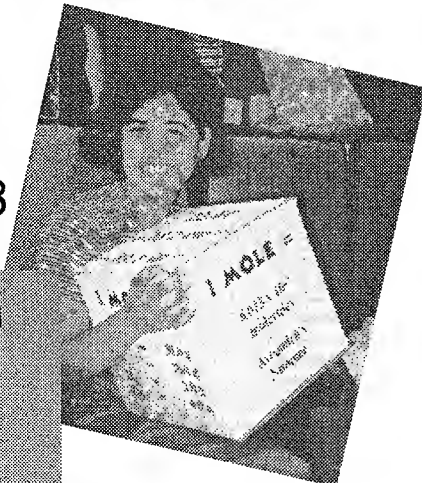
George, thank you for all. We will miss that little boy. May each of you take a bit of George back to your classroom and share him with your students.

Join us this summer for the
Eighth Biennial ACT₂ - Welch Conference

Chemistry By The Sea



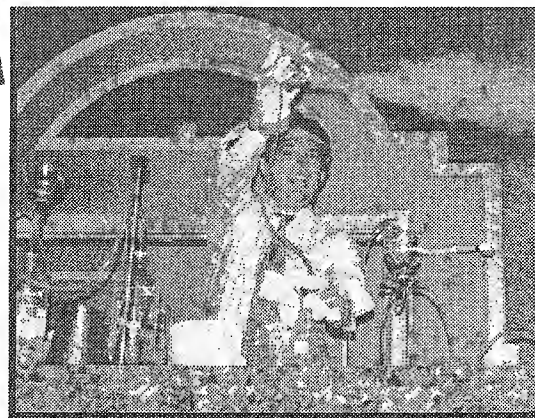
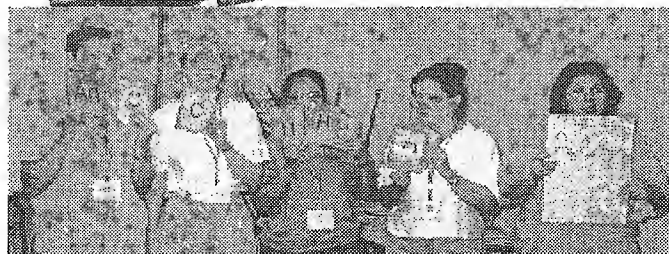
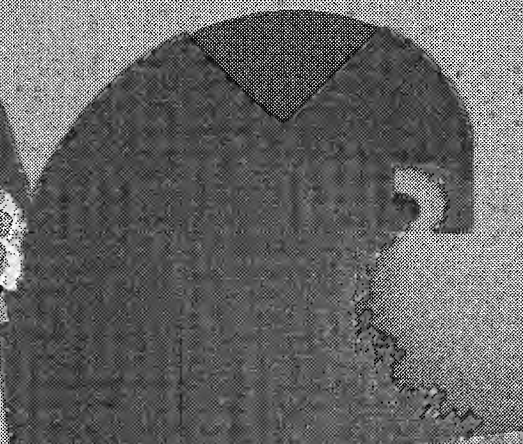
Tuesday, July 8, 2003
to
Saturday, July 12, 2003



Texas A & M - Galveston



Contact
Roxie Allen for
more details and to
submit proposals.
rallen@sjs.org

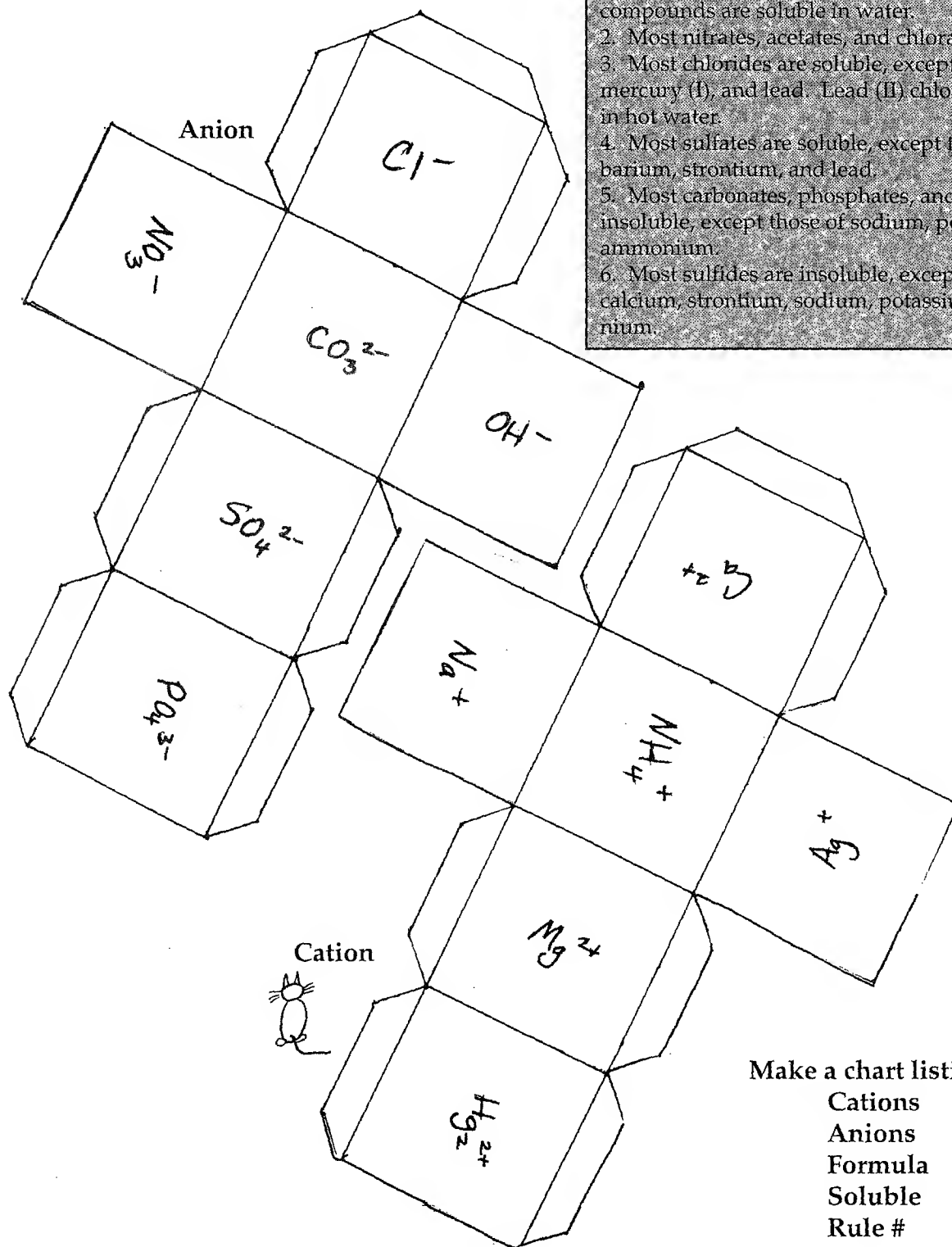


Solubility Dice

This game is very easy and fun! -- Plus it's a great way to reinforce the solubility rules. Cut out each of the two dice and fold along the edges to make them into small cubes. One cube is Anions and the other is Cations. Students roll the dice to produce a compound then determine if it is soluble using the solubility rules. You can have the students make a chart of their dice rolls.

Solubility Rules

1. Most sodium, potassium and ammonium compounds are soluble in water.
2. Most nitrates, acetates, and chlorates are soluble.
3. Most chlorides are soluble, except those of silver, mercury (I), and lead. Lead (II) chloride is soluble in hot water.
4. Most sulfates are soluble, except those of barium, strontium, and lead.
5. Most carbonates, phosphates, and silicates are insoluble, except those of sodium, potassium, and ammonium.
6. Most sulfides are insoluble, except those of calcium, strontium, sodium, potassium and ammonium.



Make a chart listing:

Cations
Anions
Formula
Soluble
Rule #

Periodic Pentathlon

by Debby Reddig
Round Rock High

Play this game with my students as a review before the Periodic Table unit test. It reinforces concepts learned during the unit as well as those previously learned during the semester.

Set Up: Divide class into teams of four. If there is an odd group of three, one person will have to compete in two events. Announce to students that each of them will compete in one of the following events: Family Feud, Radius Race, Dot Diagram Dilemma, and Chemical Activity Activity. I tell them no more than that, they can usually figure out pretty easily that Family Feud involves chemical families, Radius Race compares the sizes of atoms, Dot Diagram Dilemma involves drawing Lewis dot structures, and Chemical Activity Activity compares the reactivity of different elements. Have students sign up on a team roster for their event; that way you know everyone is participating. The fifth event of the pentathlon is Chemical Formula Fantasy, and everyone participates in it.

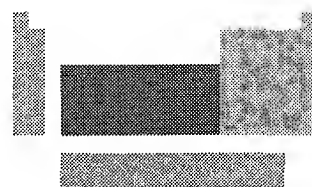
I give the students 15 or 20 minutes of preparation time so that if one member doesn't know how to do something the other group members can teach him before that event.

Playing the Game: Tape as many file folders (it's just a cover sheet) as you have teams to the chalkboard. Provide chalk and eraser for each team. At the start of each event have the participants come to the board with a periodic table. Have them flip up the file folder. Ask the question and have them write the answer under the folder, when they have finished flip the folder back down to cover their answer. No time limit within reason, but when the class starts singing the Jeopardy song to the laggards, they will know time is about up. When all the folders have been flipped down, indicating all answers are in, have them flip them back up so answers may be checked. All who get the correct answer score one point. Points are cumulative through the game. The audience may NOT help their teammates in any way. If answers are called out or hints are given that team loses a point.

MY QUESTIONS: (modify questions or events to suit you)

Family Feud

1. What is the name of the family bromine belongs to? (halogens)
2. List an alkali metal (anything from group I)
3. How many valence electrons do the halogens have? (7)
4. What is the valence number for group VIII? (0)
5. What is the name for elements #57-70? (Lanthanides)



Radius Race (Name the larger atom.)

1. titanium or nickel (Ti)
2. gallium or thallium (Tl)
3. krypton or rubidium (Rb)
4. barium or beryllium (Ba)
5. selenium or vanadium (V)

Dot Diagram Dilemma (Draw the dot diagram.)

1. strontium (2 dots)
2. argon (8 dots)
3. lead (4 dots)
4. cesium (1 dot)
5. helium (2 dots)

Chemical Activity Activity

(Which is most chemically active?)

1. carbon or nitrogen (N)
2. scandium or lanthanum (La)
3. osmium or polonium (Os)
4. tellurium or oxygen (O)
5. chlorine or argon (Cl)

At this point the classroom shifts back to normal seating arrangements for the last event.
the reACTant, Fall 2002

Chemical Formula Fantasy

On student's own paper, using periodic table only, write the formulas of the following compounds:

1. calcium carbonate (CaCO_3)
2. potassium chloride (KCl)
3. ammonium chloride (NH_4Cl)
4. magnesium oxide (MgO)
5. sodium oxide (Na_2O)
6. silver nitrate (AgNO_3)
7. magnesium sulfate (MgSO_4)
8. sodium chloride (NaCl)
9. sodium bicarbonate (NaHCO_3)
10. hydrochloric acid (HCl)

Have students trade papers (with someone from another group!) and check answers for 1 point each. Collect papers and average the score for each group. Add these points to each group's existing score for final scores. Give prizes to winning group members. I have a prize jar with slips of paper that are blindly selected by the students. Prizes include free bathroom passes, free tardy, points on lab or test, and a "kiss from the teacher" (Hershey's, of course, but you should see the wild looks I get!).

Middle School Position

Our parent organization the Science Teachers Association of Texas (STAT) has begun to formulate position statements on issues of interest to its members. It is hoped that our state law makers will view these positions with the full power and impact associated with a state-wide organization of over 5000 active vocal science educators. The first position statement endorses the need for an assessment test during middle school. The second position statement addresses the issue of class size and lab safety. Help us get the word out to legislators, State Board of Education members, Superintendents, Principals, other science teachers, and newspapers.

Assessment of Science

The Science Teachers Association of Texas (STAT) represents over 5000 Kindergarten through college science educators in the state of Texas. The Board of Directors of this organization supports the following position statement:

The Board of Directors of STAT urges the Texas Education Association, the State Board of Education, and the Legislature to work together to restate the Grade 8 Science assessment. Science belongs in the Texas Assessment of Knowledge and Skills (TAKS), and it will be best for Texas students if science is measured in all three levels, elementary, middle and high school.

Science will be assessed on the TAKS in Grades 5, 10 and Exit Level Grade 11. The Grade 5 assessment is vitally important to promote the teaching and learning of the Texas Essential Knowledge and Skills in Grades K through 5. The Grade 10 and Exit Level Grade 11 science assessments are important to ensure that Texas graduates are scientifically literate.

The competencies to be measured on the High School Science TAKS are developed through science instruction in Grades K through 12. Concepts are introduced in elementary years, developed in middle school and further applied and studied in more depth in high school science courses. Middle school science instruction contributes significantly to a strong science background for Texas students, yet there is NO middle school science assessment included in the TAKS. A benchmark test during the middle school years is necessary to ensure science knowledge is progressing appropriately.

The STAT Board of Directors is sensitive to the issues of loss of instructional time for testing, as well as the costs of additional tests. There are four core subjects that students will be held accountable for to graduate, and testing is not equitable balanced among these subjects. There is not sufficient time to remediate deficiencies that might be found on the Grade 10 assessment in time for students to be successful on the Grade 11 Exit Level assessment.

Science is one of four core subject areas assessed in the TAKS. The STAT Board of Directors agrees that science belongs in the assessment system and all Texas students should demonstrate a level of competency in knowledge of science.

The Board of Directors of the Science Teachers Association of Texas supports safe science instruction. STAT represents over 5,500 Texas science educators who provide instruction for Texas students, early childhood through college level. Laboratory and field investigations and classroom demonstrations are important parts of science education. For these experiences to be safe, adequate science laboratory and classroom space and supervision of students are essential.

Science is one of the core subject areas. Science is assessed on the TAKS in Grades 5, 10, and Exit Level Grade 11. The Grade 10 and Exit Level Grade 11 science assessments ensure that Texas graduates are scientifically literate. Effective science instruction in elementary and secondary levels includes laboratory and field activities. These activities are required to develop a student's mastery of the Texas Essential Knowledge and Skills, and safe laboratory and classroom facilities must be provided for these laboratory experiences.

Science laboratories and classrooms in Texas high schools must meet the minimum of 58 net square feet of floor space per student (41 square feet per student in elementary and 50 square feet per student in middle school) to provide safe laboratory conditions. The number of students assigned to a science laboratory or classroom must not exceed the number of built-in laboratory stations. Additionally, research shows that one science teacher should supervise no more than 24 students in a laboratory situation. No more than 24 students should be scheduled into any individual science class. It is important for the teacher and students to have immediate access to each other for safe and appropriate learning to take place. The type of course and the age and maturity level of students should also determine class size. Class size should be reduced by two students for each special needs student added to the class. If three or more special needs students are assigned to the same class, appropriate professional or paraprofessional assistance should be provided. Studies show that serious laboratory accidents are more likely when class size increases (Research available through National Science Education Leadership Association www.nsela.org and Science Teachers Association of Texas www.statweb.org). It is imperative that administrators keep these guidelines in mind when scheduling science classes to avoid risks. Safety of science students and teachers is compromised when these guidelines are not followed.

Science teachers and students must have safety training and access to appropriate safety equipment, such as eye/face wash stations, splash-proof safety goggles, emergency blankets, safety showers and fire extinguishers. Eye/face wash stations should be activated weekly. Risks are reduced and liability can be minimized when these steps are taken. Texas Safety Standards, Science Facilities Standards, two publications of the Texas Education Agency and the Charles A. Dana Center at The University of Texas at Austin, and the NSTA Guide to School Science Facilities and NSTA Exploring Safety: A Guide for Elementary Teachers are excellent resources for laboratory safety and facility requirements.

The Board of Directors of the Science Teachers Association of Texas urges science teachers, instructional leaders and administrators to adhere to these guidelines to insure that safe conditions are provided for science instruction by making appropriate science class size a priority.

(adopted 5/22/02)

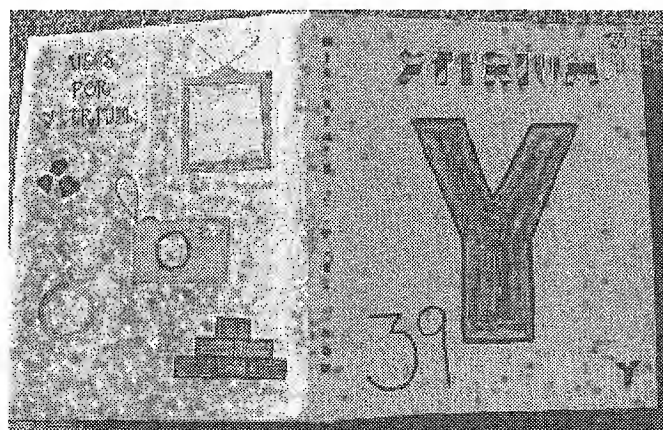
Element Book-covers

With everybody having new textbooks this year (that will most likely have to last 10 years!) we need to find creative ways for our students to take of the them. Here is a great way to get students to keep their books covered – An Element Book-cover. My students enjoyed this project and they were very proud of their book-covers. Many students even wanted to keep their book-cover to use on their book next year.

The blank back of a regular book-cover or butcher paper cut to fit the book can be used. It's important to remember to decorate only the part of the paper that will show due to folding to fit the book. The finished book-cover can be laminated to make them endure the normal abuse books go through during the semester.

The teacher determines the information included on the book-cover. Items might include the name of the element, the element symbol, and the atomic number. Other information to include could be drawings or magazine pictures depicting something the element is known for, is used for or in, substances that contain the element, facts about the discovery of the element, origin of the name of the element, and much more.

Tell the students to be creative and colorful. You will be amazed at what your students come up with.



ACT₂

Cool Mole Facts

A mole is sooooo big ...

- A mole of baseballs would fit into a bag as big as the earth.
- A mole of pennies would pay off the national debt of over \$4 trillion and still have enough left over to give every US citizen \$20 trillion.
- There about 1 mole of stars in the entire universe.
- A mole of seconds is 4 million times the earth has existed.

- There are more rice grains in a mole of rice grains than all the rice grains grown since the beginning of time.
- A mole of sheets of paper would stretch to the moon and back 80 million times.
- Assuming the human body contains 6 trillion cells and the earth has 6 billion people, the entire earth's population wouldn't even contain a mole of cells.

ACT₂



ASSOCIATED CHEMISTRY TEACHERS OF TEXAS MEMBERSHIP APPLICATION

(Current members should use this form to update information)

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Last First MI

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 NO

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Street City State Zip

PHONE NUMBERS (include area codes)

() HOME () SCHOOL () FAX

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 OTHER _____

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ACT₂ has started two new ways for companies to support our organization. We have set up a new section in this newsletter and on our web site for our new Corporate Sponsors. To become an official ACT₂ corporate sponsor contact the editor at rlgarcia@alumni.utexas.net.

ACT₂ will also begin accepting advertisements in our newsletter. Our ad rates are \$100 for a full page, \$60 for half page, and \$30 for a quarter page.

We look forward to hearing from companies and individuals who are interested in these two new ways to support our organization of over 700 active members.



Visit ACT₂ on the web at
<http://www.statweb.org/ACT2>

ASSOCIATED CHEMISTRY TEACHERS OF TEXAS
Rosendo García, Editor
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Pflugerville, TX 78660

Dated Material
Please Do Not Delay

Use Application form (p. 19) to update your membership information.

**If your Dues Date is highlighted,
this is your last issue!!**

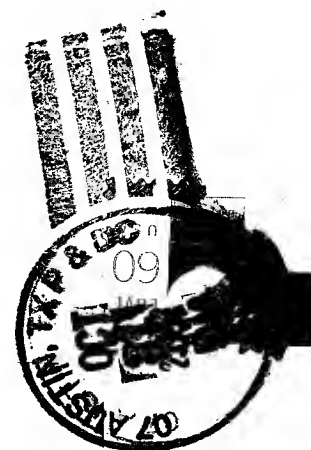
Officers Wanted

As the 8th Biennial Conference comes around we start looking for new blood to infuse our organization. Think about becoming an ACT₂ officer. Let Roxie Allen know if you are interested at rallen@sjs.org. Come on people, we need some of that new blood!



Huckabee Wins!

Chad Huckabee of Ray High School in Corpus Christi is the latest recipient of the ACS Southwest Regional Award. Chad has been teaching for over 30 years and has coached Academic Decathlon, Odyssey of the Mind and Chemistry Day. Congratulations Chad!



7/03 Status Active
Barbara Schumann
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